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Quick Reference Guide

Biological Weapons

September 2002

Characteristics of Selected Bioterrorism Agents[1, 4]

Disease/ Agent	Incubation Period	Clinical Syndrome	Lethality	Diagnostic Tests	Treatment[2]	Vaccine	Chemoprophylaxis
BACTERIAL AGENTS							
Anthrax *Bacillus anthracis*	1-5 days (possibly up to 60 days). Data from 22 patients infected in October and November 2001 indicate a median incubation period of 4 days (range of 4-7 days) incubation period for inhalational anthrax and 1-10 days (mean of 5 days) incubation period for cutaneous anthrax.	**Cutaneous:** Evolving skin lesion (face, neck, arms), progresses to vesicle, depressed ulcer, and black necrotic lesion	20% if untreated, otherwise rarely fatal	Gram stain and culture of blood, pleural and ascitic fluids, CSF, vesicular fluid or lesion exudate. Sputum rarely positive. Confirmatory serological and PCR tests available through public health laboratory network. Widened mediastinum on chest x-ray (CXR) for inhalational and occasionally, GI anthrax. CXR abnormalities also include paratracheal and hilar fullness and may be subtle. Consider chest computerized tomography (CT) if diagnosis is uncertain.	Ciprofloxacin; doxycycline. Combination therapy of ciprofloxacin or doxycycline **plus** one or two other antimicrobials should be considered with inhalational anthrax.[3] Penicillin should be considered if strain is susceptible and does not possess inducible beta-lactamases. If meningitis is suspected, doxycycline may be less optimal because of poor CNS penetration. Steroids may be considered for severe edema and for meningitis.	Inactivated vaccine (licensed but not readily available). 6 injections and annual booster	Ciprofloxacin or doxycycline, with or without vaccination; if strain is susceptible, penicillin or amoxicillin should be considered.
		Gastrointestinal (GI): Nausea, vomiting, abdominal pain, bloody diarrhea, sepsis	Approaches 100% if untreated but data are limited. Rapid, aggressive treatment may reduce mortality.				
		Inhalational: Abrupt onset of "flu-like" symptoms, fever with or without chills, sweats, fatigue or malaise, non- or minimally productive cough, nausea and vomiting, dyspnea, headache, chest pain, followed in 2 to 5 days by severe respiratory distress, mediastinitis, hemorrhagic meningitis, sepsis, shock. Limited data from the October 2001 infections indicate hemorrhagic pleural effusions to be strongly associated with inhalational anthrax and rhinorrea was present in only 1/10 patients.	Once respiratory distress develops, mortality rates may approach 90%. Begin treatment when inhalational anthrax is suspected, do not wait for confirmatory testing. Data from the 2001 infections indicate that early treatment significantly decreases the mortality rate.				
Brucellosis *B. mellitensis, B. suis, B. abortus, and B. canis*	5-60 days (usually 1-2 months)	Nonspecific "flu-like" symptoms, fever, headache, profound weakness and fatigue, gastrointestinal symptoms such as anorexia, nausea, vomiting, diarrhea or constipation. Osteoarticular complications common.	Less than 5% even if untreated. Tends to incapacitate rather than kill.	Blood and bone marrow culture (may require 6 weeks to grow *Brucella*) Confirmatory culture and serological testing available through public health laboratory network.	Doxycycline **plus** streptomycin or rifampin. Alternative therapies: ofloxacin **plus** rifampin; doxycycline **plus** gentamicin; TMP/SMX **plus** gentamicin.	None. Only animal vaccine exists.	Doxycycline **plus** streptomycin or rifampin
Inhalational (pneumonic) tularemia *Francisella tularensis*	3-5 days (range of 1-21 days)	Sudden onset of acute febrile illness, weakness, chills, headache, generalized body aches, elevated WBCs. Pulmonary symptoms such as dry cough, chest pain or tightness with or without objective signs of pneumonia, are present. Progressive weakness, malaise, anorexia, and weight loss occurs, potentially leading to sepsis and organ failure.	About 30%-60% if untreated	Largely clinical diagnosis. Culture of blood, sputum, biopsies, pleural fluid, bronchial washings (culture is difficult and potentially dangerous). Confirmatory serological testing available through public health laboratory network.	Streptomycin; gentamicin. An alternative is ciprofloxacin.	Live attenuated vaccine (USAMRIID, investigational) given by scarification; currently under review by FDA, limited availability.	Tetracycline; doxycycline; ciprofloxacin
Pneumonic plague *Yersinia pestis*	1-10 days (typically 2-3 days)	Acute onset of "flu-like" prodrome: fever, myalgia, weakness, headache. Within 24 hours of prodrome, chest discomfort, cough, and dyspnea appear. By day 2-4 of illness, symptoms progress to cyanosis, respiratory distress and hemodynamic instability.	Almost 100% if untreated. 20%-60% if appropriately treated within 18-24 hours of symptoms. Begin treatment when diagnosis of plague is suspected, do not wait for confirmatory testing.	Gram stain and culture of blood, CSF, sputum, lymph node aspirates, bronchial washings. Confirmatory serological and bacteriological tests available through public health laboratory network.	Streptomycin; gentamicin. Other alternatives include doxycycline, tetracycline, ciprofloxacin, and chloramphenicol. Chloramphenicol is 1st choice for meningitis except in pregnant or lactating women.	Inactivated whole cell vaccine licensed but not readily available. Injection with boosters. Vaccine not protective against aerosol in animals.	Tetracycline; doxycycline; ciprofloxacin

Q-Fever *Coxiella burnetii*	2-14 days (may be up to 40 days)	Nonspecific febrile disease, chills, cough, weakness and fatigue, pleuritic chest pain, pneumonia may be present.	1%-3% Fatalities are uncommon even if untreated, but relapsing symptoms may occur.	Isolation of organism may be difficult. Confirmatory testing via serology or PCR available through public health laboratory network.	Tetracycline; doxycycline	Inactivated whole-cell vaccine (investigational). Skin test to determine prior exposure to *C. burnetii* recommended before vaccination.	Tetracycline; doxycycline
VIRAL AGENTS							
Smallpox *Variola major virus*	7-17 days	Prodrome of high fever, malaise, prostration, headache, vomiting, delirium followed in 2-3 days by maculopapular rash uniformly progressing to pustules and scabs, mostly on extremities and face. Requires astute clinical evaluation; may be confused with chickenpox, erythema multiforme with bullae, or allergic contact dermatitis.	30% in unvaccinated persons	Pharyngeal swab, vesicular fluid, biopsies, scab material for definitive testing through public health laboratory network. Notify CDC Poxvirus Section at 404 639-2184.	Supportive care. Cidofovir shown to be effective *in vitro*, and in experimental animals infected with surrogate orthopox virus.	Attenuated-strain vaccinia vaccinederived from calf lymph; given by scarification (licensed, limited supply). Vaccination may be effective within 3-4 days of exposure.	Vaccination given within 3-4 days following exposure can prevent, or decrease the severity of, disease.
Viral Encephalitis *Venezuelan (VEE)* *Eastern (EEE)* *Western (WEE)*	VEE: 2-6 days EEE, WEE: 7-14 days	Systemic febrile illness, with encephalitis developing in some populations. Generalized malaise, spiking fevers, headache, myalgia. Incidence of seizures and/or focal neurologic deficits may be higher after biological attack.	VEE: less than 10% EEE: 50-75% WEE: 10%	Clinical and epidemiological diagnosis. WBC count may show striking leukopenia and lymphopenia. Confirmatory serological tests and viral isolation available through public health laboratory network.	Supportive care; analgesics, anticonvulsants as needed	Several IND vaccines, poorly immunogenic, highly reactogenic.	None available
Viral Hemorrhagic Fevers (VHFs) *Arenaviruses (Lassa, Junin, and related viruses);* *Bunyaviruses (Hanta, Congo-Crimean, Rift Valley);* *Filoviruses (Ebola, Marburg);* *Flaviviruses (Yellow Fever, Dengue, various tick-borne disease viruses)*	4-21 days	Fever with mucous membrane bleeding, petechiae, thrombocytopenia and hypotension in patients w/o underlying malignancies. Malaise, myalgias, headache, vomiting, diarrhea may occur.	Variable depending on viral strain 15% to 25% with Lassa fever to as high as 90% with Ebola	Confirmatory serological testing and viral isolation available through public health laboratory network. Notify CDC Special Pathogens Office at 404 639-1115.	Supportive therapy. Ribavirin may be effective for Lassa fever, Argentine hemorrhagic fever, and Congo-Crimean hemorrhagic fever.	Yellow fever vaccine is the only licensed vaccine available. Vaccines for some of the other VHFs exist but are for investigational use only.	Ribavarin is suggested for Congo-Crimean hemorrhagic fever and Lassa fever.
Disease/ Agent	**Incubation Period**	**Clinical Syndrome**	**Lethality**	**Diagnostic Tests**	**Treatment[2]**	**Vaccine**	**Chemoprophylaxis**

Abbreviations:

CDC - Centers for Disease Control and Prevention
CSF - Cerebrospinal Fluid
IND - Investigational New Drug
PCR - Polymerase Chain Reaction
RBC - Red Blood Cell
SMX - Sulfamethoxazole
TMP - Trimethoprim
USAMRIID - United States Army Medical Research Institute of Infectious Diseases
WBC - White Blood Cell

(See reverse side for more information.)

Characteristics of Selected Bioterrorism Agents[1, 4]

Toxin/ Agent	Incubation Period	Clinical Syndrome	Lethality	Diagnostic Tests	Treatment[2]	Vaccine	Chemopro-phylaxis
BIOLOGICAL TOXINS							
Botulinum toxin *Clostridium botulinum*	1-5 days (typically 12-36 hours)	Blurred vision, diplopia, dry mouth, ptosis, fatigue. As disease progresses, acute bilateral descending flaccid paralysis, respiratory paralysis resulting in death.	60% without ventilatory support	Treatment and reporting is based on clinical diagnosis. Serum and stool should be assayed for toxin by mouse neutralization bioassay, which may require several days.	Supportive care - ventilation may be necessary. Trivalent equine antitoxin (serotypes A,B,E - licensed, available from the CDC) should be administered immediately following clinical diagnosis. Anaphylaxis and serum sickness are potential complica-tions from antitoxin. Aminoglycosides and clindamycin must not be used.	Pentavalent toxoid (A-E), yearly booster (investigation-al, CDC) Not available to the public	Antitoxin might be sufficient to prevent illness following exposure but is not recommended until patient is showing symptoms.
Enterotoxin B *Staphylo-coccus aureus*	3-12 hours	Acute onset of fever, chills headache, nonproductive cough. Normal chest x-ray.	Probably low (little data available for respiratory exposure).	Clinical diagnosis. Serology on acute and convalescent serum can confirm diagnosis.	Supportive care.	No vaccine available	None available
Ricin toxin *Ricinus communis*	18-24 hours (acute symptoms may appear as early as 4-8 hours following exposure)	Weakness, chest tightness, fever, cough, pulmonary edema, respiratory failure, circulatory collapse, hypox-emia resulting in death (usually within 36-72 hours).	Mortality data not available but potential for death is likely to be high with extensive exposure.	Clinical and epidemiological diagnosis. Confirmatory serological testing available through public health laboratory network.	Supportive care. Treatment for pulmonary edema. Gastric decontamination if toxin is ingested.	No vaccine available	None available
T-2 mycotoxins *Fusarium, Myrotecium, Trichoderma, Stachybotrys and other filamentous fungi*	Minutes to hours	Abrupt onset of mucocutaneous and airway irritation and pain may include skin, eyes, and gastrointestinal tract; systemic toxicity may follow.	Severe exposure can cause death in hours to days.	Consult with local health department regarding specimen collection and diagnostic testing procedures. Confirmation requires testing of blood, tissue and environmental samples.	Clinical support. Soap and water washing within 4-6 hours reduces dermal toxicity; washing within 1 hour may eliminate toxicity entirely. No effective medications or antidotes.	No vaccine available	None available
Toxin/ Agent	Incubation Period	Clinical Syndrome	Lethality	Diagnostic Tests	Treatment[2]	Vaccine	Chemopro-phylaxis

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Important Note

1. Physicians should report noticeable increases in unusual illnesses, symptom complexes, or disease patterns (even without definitive diagnosis) to public health authorities. Prompt reporting of unusual patterns of illness can allow public health officials to initiate an epidemiologic investigation earlier than would be possible if the report awaited definitive etiologic diagnosis. **If you suspect an unusual disease or possible outbreak, please call your state or local health department.** These numbers are available at: ***http://www.statepublichealth.org/directory.php*** and ***http://www.naccho.org/general8.cfm***

   Information contained in this table was current as of September 2002, and is intended for educational purposes only. Medication information should be researched and verified before initiation of patient treatment.

2. **Different scenarios may require different treatment regimens. Please consult listed references and an infectious disease specialist for definitive dosage information.**

3. Other agents with *in vitro* activity suggested for use in conjunction with ciprofloxacin or doxycycline for treatment of inhalational anthrax include rifampin, vancomycin, imipenem, chloramphenicol, penicillin and ampicillin, clindamycin, and clarithromycin.

4. **This table was compiled from the following references:**

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